Remarks

Claims 1-25 are in the application, of which only claim 1 is in independent form and is amended.

Claims 1, 2, 4, 5, 8, and 11-25 stand rejected under 35 USC § 102(b) for anticipation by Cordingley et al., U.S. Publication No. 2002/0167581. Applicants respond as follows to this rejection.

To support her position, the Examiner points to several passages of Cordingley et al., certain ones of which applicants analyze below.

The Abstract describes locally processing a predetermined microstructure formed on a substrate without causing undesirable changes in electrical or physical characteristics of the substrate or other structures formed on it. Paragraph [0025] states that the processing occurs with multiple pulses in a single pass operation of a thermal processing system. "The processing removes the at least one microstructure without damaging the substrate." (*Id.*, 4th sentence.) Paragraph [0036] states that "[t]wo pulses may be used to completely process the at least one microstructure, and the laser energy of each of the pulses is about 60-70% of laser energy required for laser processing the at least one microstructure with a single pulse."

The foregoing passages reveal that "processing" as defined by Cordingley et al. refers to removal of at least one microstructure and that the two laser pulses described contribute at least partly to microstructure material removal.

Amended independent claim 1 of the present application, which is the only independent claim, recites applying heating energy in the form of a light beam to a target material location to elevate the temperature of the target material while minimizing at the target location dimensional distortion of the target material, other than the portion undergoing removal by a processing laser output. Support for this amendment can be found at application paragraph [0021]. The result is increased throughput. This differs from Cordingley et al., which applies laser pulses to "process" (*i.e.*, at least partly remove) the target microstructure and leave intact the substrate and other structures formed on it. Clearly, none of the laser pulses applied by Cordingley et al. to the target microstructure has or is intended to have properties that minimize dimensional distortion of the target structure. Cordingley et al. seeks to at least partly rupture the target microstructure with each laser pulse applied to it. Cordingley et al. apparently does not contemplate an increase in throughput. Applicants request, therefore, that the anticipation rejection of claim 1 and its dependent claims 2, 4, 5, 8, and 11-25 be withdrawn.

Claim 3 stands rejected under 35 USC § 103(a) for obviousness over Cordingley et al., for the reasons stated in the anticipation rejection, and further in view of Owen et al., U.S. Patent No. 5,841,099. The Examiner relies on Owen et. al. for use of a Q-switched laser to drill vias and blind vias in multilayer materials. Claims 9 and 10 stand rejected for obviousness over Cordingley et al. for the reasons stated in the anticipation rejection, and further in view of Fahey et al. International Publication No. WO 03/002289 A1. The Examiner relies on Fahey et al. for disclosure of dicing of wafers using an IR laser of differing wavelengths. Finally, claims 6 and 7 stand rejected for obviousness over Cordingley et al. for the reasons stated in the anticipation rejection, and further in view of general knowledge of wavelength range selection criteria based on processing operations needed.

Because each of the obviousness rejections is premised on the Examiner's reasons for relying on Cordingley et al., applicants rely on their arguments traversing the anticipation rejection to dispute the obviousness rejections. None of the secondary references cited changes the fundamental teaching of Cordingley et al. to use each of multiple laser pulses to at least partly remove material from a target microstructure.

In her Response to Arguments, the Examiner disagrees with applicants' position that Cordingley et al. does not teach dimensional stability. The Examiner contends that Cordingley et al. discloses an improved thermal-based laser method of processing a predetermined microstructure formed on a substrate without causing undesirable changes in electrical and physical characteristics of the substrate or other structures formed on it.

To address the Examiner's argument, applicants have amended independent claim 1 to remove the reference to dimensional stability and to recite, for the heating step in the second paragraph, "elevat[ing] the temperature of the target material while minimizing dimensional distortion of the target material" and, for the target material removal step in the third paragraph, "minimizing at the target material location dimensional distortion of the target material, other than the portion undergoing removal."

Applicants submit that Cordingley et al. neither performs nor contemplates the heating step recited in paragraph 2 of claim 1. As stated above, each of the laser pulses of Cordingley et al. at least partly ruptures the target microstructure. Applicants' application of heating energy purposefully minimizes dimensional distortion of (*i.e.*, does not rupture) the target material. Applicants believe amended claim 1 clearly distinguishes between the application of heating energy applied by the light beam and removal of target material by the processing laser beam, as discussed above.

Applicants believe their application is now in condition for allowance and respectfully request the same.

The Commissioner is hereby authorized to charge any ***additional*** fees which may be required in connection with filing of these papers, or credit overpayment to Deposit Account No. 19-4455.

Respectfully submitted,

Yunlong Sun, Liu Jingjiao, Richard S. Harris, Pradeep Subrahmanyan, Robert F. Hainsey, and Weixiong Lu

By _____
Paul S. Angello
Registration No. 30,991

STOEL RIVES LLP
900 SW Fifth Avenue, Suite 2600
Portland, OR 97204-1268
Telephone: (503) 224-3380
Facsimile: (503) 220-2480
Attorney Docket No. 50001/91:2